INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

(**An Autonomous Institution under MOE, Govt. of India**)
Maruthamala. P.O, Vithura, Thiruvananthapuram – 695551

School of Data Science

Computer Organization & Operating Systems

Lab Examination, Vasanth 2026

Maximum Marks: **100** Course Code: **DSC315**
Weightage: **10** Date: **2026-April-02**

Instructions: Question 3 is compulsory. Answer **one** question from Questions 1 and 2.

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1. **Process Creation with File Reading**
   (a) Takes an integer input `n` from the user, where `1` $\leq$ `n` $\leq$ `10`.
   (b) Creates `n` processes.
   (c) Each process should print the contents of a unique file named `input_file_x.txt`, where `x` is a distinct integer from `0` to `n-1`.

2. **Process Tree using Fork**
   (a) Creates three child processes.
   (b) Each child process selects `r` $\xleftarrow{\$}$ $\{0, 1\}$, and then creates `r` additional child processes. The resulting process structure should be like a binary tree.
   (c) Each process should print:
   - Its own process ID (PID)
   - The value of `r`, it selects
   - The PIDs of its `r` child processes

3. **Multithreading with File Processing**
   Given a file `input_integers.txt`, which contains integers and has a size of `117694 bytes`, write a C program that creates **5 threads** to find the maximum value.
   (a) Assume that the file is divided into **5 equal parts**. Creating new files is not allowed.
   (b) Each thread scans its assigned part and finds the **maximum value**.
   (c) After all threads finish execution, the main program prints the maximum value found by each thread.
   (d) Finally, the main program outputs the overall maximum value.

   Hint: To skip a specified number of bytes in a file, use:

```
fseek(fp, no_of_skip, SEEK_SET);
```